REMARKS

Reconsideration and withdrawal of the rejections of record are respectfully requested.

Summary of Status of Amendments and Office Action

In the present amendment, claims 1 and 2 are amended. Therefore, claims 1-12, 22-27 and 44-49 remain pending in the application with claims 1, 2, 6, 7, 9, 11 being independent.

Claims 6, 8, 11, 12, 27, 46, 47 and 49 are allowed.

Claims 1-5, 9, 10, 22-26, 44, 45 and 48 are rejected.

Claims 1-5, 22-26, 44 and 45 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claim 9 is rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements.

Claim 9 is rejected under 35 U.S.C. § 102(b) as being anticipated by Nakamura, U.S. Patent No. 5,517,758.

Claims 1, 3, 4 and 44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758.

Claims 2, 22-24 and 45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758, in view of Adlam et al, U.S. Patent No. 5,861,076.

Claims 10 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758.

Discussion Of Telephone Interview

Applicants express appreciation for the courtesies extended by Examiner Alcala to Arnold Turk during a July 17, 2003 telephone interview wherein claims 1 and 2 were discussed. In particular, during this telephone interview, the Examiner suggested clarifying amendments to claims 1 and 2. In order to advance prosecution of the application, these clarifying amendments are presented herein.

It was also noted that a Petition for Correction of Inventorship Under 37 C.F.R. 1.48(b) has been filed on December 3, 2002, but has not been addressed in the Office Action.

Still further, it was pointed out that Applicants' written response will include the response to the rejections based upon prior art.

Request For Granting Of Petition For Correction of Inventorship

Applicants note that a Petition for Correction of Inventorship Under 37 C.F.R. 1.48(b) has been filed on December 3, 2002, but has not been addressed in the Office Action. Accordingly, it is respectfully requested that the next communication from the Patent and Trademark Office acknowledge the Petition, and indicate that it has been granted whereby the inventorship of the presently claimed invention has been corrected.

Response to 35 U.S.C. 112, Second Paragraph, Rejections

Claims 1-5, 22-26, 44 and 45 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

In response, as noted above, the claims are amended herein to include what should be considered to be cosmetic changes to utilize language that is preferred by the Examiner. This language is not intended to change the claim scope, with the claims merely being amended to advance the application to issue.

In view of the cosmetic amendments to the claims, this ground of rejection should be withdrawn.

Claim 9 is rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements.

In response, this ground of rejection questions whether the roughened layer is located on the viahole, or on at least a part of the surface of the conductor surface. In response, Applicants respectfully submit that the claim recitation clearly indicates that the roughened layer is on at least a part of the surface of the under layer conductor circuit connected to the viahole. Thus, the surface of the viahole need not be roughened in this embodiment, but can be roughened. Moreover, the roughened layer on the under layer conductor circuit can be formed on, not only the portion connecting to the viahole, but also the whole surface of the under layer conductor circuit, such as disclosed in the specification at page 11, second paragraph.

Accordingly, claim 9 is definite, and this ground of rejection should be withdrawn.

Response To Rejections Based Upon Prior Art

The following four rejections are present in the Office Action:

Claim 9 is rejected under 35 U.S.C. § 102(b) as being anticipated by Nakamura, U.S. Patent No. 5,517,758.

Claims 1, 3, 4 and 44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758.

Claims 2, 22-24 and 45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758, in view of Adlam et al, U.S. Patent No. 5,861,076.

Claims 10 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura, U.S. Patent No. 5,517,758.

In response, Applicants note that Nakamura does not disclose a roughened layer on at least a part of the surface of the conductor surface, as recited in independent claims 1, 2 and 9. Instead, Nakamura discloses that the insulating resin layer, such as insulating resin layer 74, and the viaholes 75 and the through-holes 76 are roughened. This is similar to the roughened surfaces discussed in the Background Art section of Applicants' specification.

Moreover, as noted in the rejection, Nakamura does not disclose that the under layer 73 is produced from an electroless plated film and an electrolytic plated film. However, the rejection relies upon the disclosure of Nakamura at column 9, lines 25-27 (and apparently column 8, lines 13-19), wherein the production of an upper conductive metal layer is disclosed. The rejection is apparently asserting that it would have been obvious to make each conductor layer in this manner to increase the density of the printed circuit board. However, in contrast to the assertion in the rejection, there

is no direction in the prior art to support this assertion. Accordingly, if this rejection is maintained, the Examiner is respectfully requested to support the rejection with documentary evidence.

Thus, Nakamura does not teach or suggest, as recited in independent claim 1, a multilayer printed circuit board comprising a plurality of interlaminar insulating layers and conductor circuits, said printed circuit board being formed by laminating a first interlaminar insulating layer on a conductor circuit of a substrate and forming at least a second conductor circuit and a second interlaminar insulating layer on the first interlaminar insulating layer, wherein the conductor circuit is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer on at least a part of the surface of the conductor circuit. Moreover, Nakamura does not teach or suggest, as recited in independent claim 2, a multilayer printed circuit board comprising a plurality of interlaminar insulating layers and conductor circuits, said printed circuit board being formed by laminating a first interlaminar insulating layer on a conductor circuit of a substrate and forming at least a second conductor circuit and a second interlaminar insulating layer on the first interlaminar insulating layer, wherein the conductor circuit is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer on at least a part of the surface of the conductor circuit, and the surface of the roughened layer is covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal.

Still further, with regard to claim 9, the rejection improperly only refers to viahole roughness. In this regard, claim 9 is directed to a multilayer printed circuit board comprising a substrate provided with an under layer conductor circuit, an interlaminar insulating layer formed thereon and an upper layer conductor circuit formed on the interlaminar insulating layer, and a viahole

connecting both the conductor circuits to each other, in which the viahole is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer having a roughened surface formed by etching treatment, polishing treatment, or redox treatment, or having a roughened surface formed by a plated film on at least a part of the surface of the underlayer conductor circuit connected to the viahole. Applicants respectfully submit that each and every limitation of the claimed subject matter must be addressed in an anticipation rejection.

Moreover, the rejection improperly refers to reference numeral 93 of Nakamura to denote an under layer and an upper layer, and that these layers are connected by a viahole.

Expanding upon the above, Nakamura does not disclose a roughened layer on at least a part of the surface of the conductor surface, as recited in independent claims 1, 2 and 9. Instead, Nakamura discloses that the insulating layer, such as resin layer 74, and the viaholes 75 and the through-holes 76 are roughened. Nakamura does not disclose that the under layer is produced from an electroless plated film and an electrolytic plated film.

Applicants therefore respectfully submit that the rejections of record are without appropriate basis at least for these reasons. Moreover, Adlam does not overcome the deficiencies of Nakamura.

Thus, Applicants respectfully submit that the only teaching or suggestion that would lead one having ordinary skill in the art to arrive at Applicants' invention is within Applicants' disclosure, and the use of such disclosure by the Examiner is improper. In order to support the conclusion that the claimed invention is either anticipated or rendered obvious over the prior art, the prior art must either expressly or inherently teach the claimed invention or the Examiner must present a convincing line of reasoning why the artisan would have found the claimed invention to have been obvious in

light of the teachings of the references. Ex parte Clapp, 227 USPQ 972 (B.O.A. 1985).

Additionally, each of the dependent claims is patentable over the prior art in view of the fact that each of these dependent claims includes the limitations of the independent claims. Moreover, each of the dependent claims is patentable over the prior art because it would not have been obvious for one having ordinary skill in the art to incorporate such dependent claim features into the invention as more broadly recited in the independent claims.

CONCLUSION

For the reasons advanced above, Applicants respectfully submit that all pending claims patentably define Applicants' invention.

Allowance of the application with an early mailing date of the Notices of Allowance and Allowability is therefore respectfully requested.

Should the Examiner have any further comments or questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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APPENDIX
MARKED-UP COPY OF AMENDED CLAIMS 1 AND 2

1. (Thrice Amended) A multilayer printed circuit board comprising a plurality of interlaminar insulating layers and conductor circuits, said printed circuit board being formed by laminating a first interlaminar insulating layer on a conductor circuit of a substrate and [repeating formation of] forming at least a second conductor circuit and [an] a second interlaminar insulating layer on the first interlaminar insulating layer, wherein the conductor circuit is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer on at least a part of the surface of the conductor circuit.

2. (Four Times Amended) A multilayer printed circuit board comprising a plurality of interlaminar insulating layers and conductor circuits, said printed circuit board being formed by laminating a first interlaminar insulating layer on a conductor circuit of a substrate and [repeating formation of] forming at least a second conductor circuit and [an] a second interlaminar insulating layer on the first interlaminar insulating layer, wherein the conductor circuit is comprised of an electroless plated film and an electrolytic plated film, and a roughened layer on at least a part of the surface of the conductor circuit, and the surface of the roughened layer is covered with a layer of a metal having an ionization tendency of more than copper but not higher than titanium, or of a noble metal.